# Bridging the Gap between the User's Digital and Physical Worlds with Compelling Real Life Social Applications

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## General Description of the Proposal

Nowadays, the majority of web sites and web-based applications encourage their users to engage in social interactions such as adding comments, expressing opinions or sharing content with their friends in social networking websites. Social activities involve basically: (i) users, (ii) user generated content –UGC- that users create and share and (iii) resources that are described with the created content. The logical structure of the underlying knowledge emerges as a set of links between the three aforementioned components. More concretely, a user generally annotates resources with different forms of user generated content, like social annotations, tags or links. As a consequence, huge amounts of shared social data are now available, which raises new challenges for information management and discovery. Each social interaction represents an opportunity to create valuable knowledge that can be further leveraged for added-value services (e.g. recommendation or prediction).

Our approach for the manipulation of social data consists of analysing both the structure of such networks and the content of the interactions that occur between peers in the network. Our system consists of a logical framework for social network analysis that provides application developers with tools for building efficient applications that are targeted to improve the user's communications in different social contexts. The objective is thus to bridge the current gap between the users' digital and real social lives, which are often completely separated (e.g. knowledge produced in one is not available in the other). This can be declined either to web-based recommendation systems or to applications that enrich the user's social experience in real-life scenarios. Such applications can address the whole network of generated connections between users, UGC and resources, or focus on an element and analyse the interactions that specifically involve it.

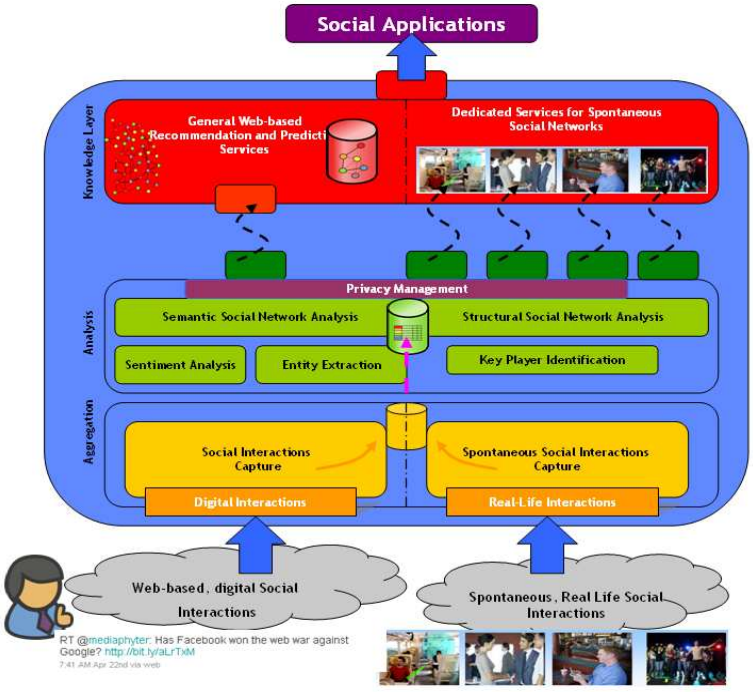


Figure 1: Logical Framework for Social Network Analysis

Our logical framework (Figure 1) has collectors for the social data from different social networks of the user, analysers that perform either statistical (i.e. analysis of the distribution of links and communities etc.) or semantic analysis (i.e. content analysis, sentiment analysis, disambiguation etc.) on the data and a data presentation layer that stores the extracted knowledge and exposes different services for application enablement. We introduce in this context the global process of collecting every possible social interaction to provide added-value services such as people recommendations. From the social interactions of a user our system builds a dynamic profile for each peer in the network that reflects different facets of the user: the topics of expertise, the topics where they need explanations or the topics they want to interact about. The application we present to illustrate this process connects the user's social network with their web navigation by giving them valuable information from trusted sources (e.g. opinions of friends about a product) in the scope of better decision making. The underlying motivation for this approach is a survey performed by the Nielsen Company[1] showing that consumers strongly prefer recommendations and advertisements from people they know (e.g. word-of-mouth in a community of friends).

A second case of social networks are "spontaneous social networks" (Figure 2) that appear in real life situations as implicit communities through the sharing of a common activity (an activity is described by a resource and its usage for a defined goal) and/or a common location. The digital representation, collection and analysis of such communities establishes links between people that may often be strangers but that together may behave in a more efficient way.

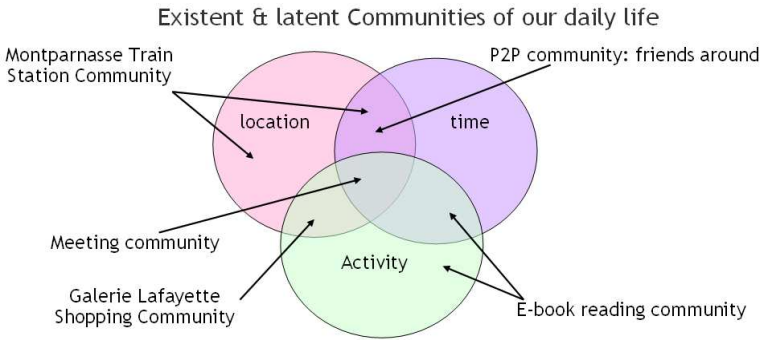


Figure 2: Spontaneous Social Networks

An associated social network can be provided for any activity and location where contextually pertinent information can be exchanged and new links between people can be created. Users profit from the natural extension of their habitual online social interactions to their real-life sphere and vice-versa. Foursquare[2] takes a user's real-life location online to propose a social application that links locations and people through simple user-generated content in the form of an "I'm here" check in action. In this book chapter, we expose a vision where any real life activity and resource (location, object, content) can become a trigger for online social interactions. In addition to serving as an important basis for knowledge and conversations linking people, activities and resources become an important part of the social graph with their own strong, weak and temporary ties. This enables the exploration of social structures more sophisticated than the simple explicit friends list found in people-oriented online social networking sites such as Facebook[3]. In addition, these "spontaneous social networks" can offer contextually pertinent added-value services, enabled by the collection of dedicated social interactions.

To demonstrate the utility of spontaneous social networks, we present an application that transforms the activity of reading into a social experience. This social network is enabled by the digitization of a book into an e-book. People reading the same book will be temporary tied together in the social network of the book. The production of user-generated content such as annotations and conversations around the e-book provides an ecosystem for added-value service, such as community-based summaries of the e-book at any bookmark, exploitation of pertinent annotations to interact with people sharing similar concerns or able to provide relevant explanations. Another service can help users rapidly access the information that will help them progress in their learning curve. By nature, learners are diverse, each with different and specific needs, and each student has their own learning path; social annotations can be exploited to recommend the next steps in a learning process, such as the next paragraph to read, the most appropriate social annotations to read, the most relevant people to contact, or a suggestion of another spontaneous social network of a new book to connect with in order to enrich the learning experience.

[1] The Nielsen Company, www.nielsen.com – visited July 2010
[2] Foursquare Social Location-based Application, www.foursquare.com – visited July 2010
[3] Facebook Online Social Networking Site, www.facebook.com – visited July 2010

We will give readers an overview of such a spontaneous social network and its pertinence in the context of new methods for collaborative learning.

From the economic perspective, the question is how the value created by these new social services could benefit to the current actors of the eBook market: authors, publishers, eBook platform owners, communication operators, final customers. We describe our solution of "knowledge market" based on annotation exchange taking into consideration their virtual values. The most desired annotations, coming from experts or with specific characteristics: completeness, rarity… have more value than others. This "knowledge market" is to benefit to current stakeholders in the eBook market by creating higher eBook demand, steepening final customer learning path and promoting the work of experts.

In a second illustration of this concept we go further and consider places (e.g. a house or train station) as the underlying resource for spontaneous social networks. In a given place, we build a social network of people and objects that can be further employed to establish implicit connections between users or give seamless authorization to use resources in the environment according to social & physical proximity. For instance, during a dinner, my guest friends are able to seamlessly share information and photos, use my TV screen for a photo show of their latest trip but they can also keep track of the present people, of their interactions and some of the connected objects. Later on, one guest will then be able to share a picture directly on my digital photo frame and also with the other guests, allowing new communications with the persons who were present at the dinner. We have thus collected new real-life exchanges and connections between people and objects and we are now able to capitalize on them to build advanced added-value services.

In conclusion, this chapter will allow readers with different backgrounds to have an upper-view of the global process of social network analysis for real life social application enablement. In this scope, we address the corresponding scientific and engineering challenges and our learned lessons during the design and implementation of the framework.

## Targeted Audiences and Topics

The proposed book chapter aims at providing professionals (e.g. market analysers) and engineers (e.g. application developers, researchers) a vision of application enablement based on social network analysis. For this purpose, we present several real life scenarios and their implementation/evaluation. In such way, market analysers can use our chapter to understand the current and future trends in this area and to better choose the kind of applications they intend to support. Application developers will find in this book chapter a guide for choosing the right technology and data representation that best fits the needs of the social application they are developing. The chapter proposal best fits in-between Part II and Part III of the call as we deal with both the scientific challenges of data collection, pre-processing and intelligent techniques for analysis and the Application of recommendation, prediction, knowledge - and privacy management.

The authors of this chapter proposal have both an academic and industrial background, which allows them to analyse the issue of social application enablement both from the perspective of scientific challenges and industrial impact.

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